

FCW SERIES

15W WIDE INPUT RANGE

DANUBE

FEATURES

- 15W DIL PACKAGE
- INDUSTRY STANDARD PACKAGE
- 9-18V,18-36V,36-72V,9-36V,18-72V WIDE INPUT RANGE
- REGULATED OUTPUT
- 100% BURN IN
- UL 94V-0 PACKAGE MATERIAL
- CUSTOM SOLUTIONS AVAILABLE
- RoHS COMPLIANT
- 3 YEARS WARRANTY



OUTPUT SPECIFICATIONS

Voltage Set-point Accuracy	+/-2% max.
Temperature Coefficient	+/-0.05%/°C
Ripple & Noise(20MHz BW) ¹	100mVp-p max.
Line Regulation ²	+/-0.5% max.
Load Regulation ³	+/-0.5% max.
Minimum Load	10% of Full Load
Short Circuit Protection	Continuous
Short Circuit Restart	Automatic
Over Load Protection	180% typ.
Transient Response ⁵	200uS max.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-25°C to +71°C
Case Temperature	+105°C max.
Storage Temperature	-55°C to +125°C
Humidity	95% max.
Cooling	Free-Air Convection

INPUT SPECIFICATIONS

Input Voltage Range	2:1 or 4:1 Input Range
Input Filter	Pi Network
Protection	Fuse Recommended
Start up time (Nominal input) Vin: 12V & 24V	25ms max.
Start up time (Nominal input) Vin: 48V	1s max.

GENERAL SPECIFICATIONS

Efficiency	76% min.
Isolation Voltage ⁴	1500 VDC min Standard Models
	3000 VDC min Suffix "3K" Models
Isolation Resistance	10 ⁹ ohms min.
Isolation Capacitance	550pF max.
Switching Frequency	150 KHz min.
MTBF ⁶	>700,000 Hours
Weight	31.2g typ.
Case Material	Six-Side Shielded Case
Case Size	50.8mm*25.4mm*11.2mm
Potting Material	Epoxy(UL94V-0)
Radiated Emissions	EN55032 Class A

ALL SPECIFICATIONS TYPICAL AT NOMINAL LINE, FULL LOAD , AND 25 °C UNLESS OTHERWISE NOTED.

¹ Measured with 1uF ceramic capacitor connect to the output pins.

² High Line to Low Line.

³ Load Regulation is for output load current change from 10% to 100%.

⁴ 1500VDC for 10 seconds,3000VDC for 1 seconds.

⁵ 25% Step Load Change.

⁶ MIL-HDBK-217F @25 °C , Ground Benign.

● SELECTION GUIDE(1) 2:1 10W-15W OUTPUT

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT ⁷ CURRENT(mA)		EFF (%) ⁸	CAPACITOR LOAD MAX.
				FULL LOAD	NO LOAD		
FCWS-1203.3(A) (-3K)	9-18	3.3	3000	1070	35	78	2700uF
FCWS-1205(A) (-3K)	9-18	5	3000	1580	30	79	2700uF
FCWS-1212(A) (-3K)	9-18	12	1250	1525	30	82	1800uF
FCWS-1215(A) (-3K)	9-18	15	1000	1525	30	82	1500uF
FCWS-1224(A) (-3K)	9-18	24	625	1560	30	80	1000uF
FCWD-1205(A) (-3K)	9-18	+/-5	+/-1500	1570	30	80	+/-1200uF
FCWD-1212(A) (-3K)	9-18	+/-12	+/-625	1560	30	80	+/-820uF
FCWD-1215(A) (-3K)	9-18	+/-15	+/-500	1530	30	82	+/-680uF
FCWD-1224(A) (-3K)	9-18	+/-24	+/-313	1565	80	80	+/-560uF
FCWS-2403.3(A) (-3K)	18-36	3.3	3000	543	20	76	2700uF
FCWS-2405(A) (-3K)	18-36	5	3000	790	20	79	2700uF
FCWS-2409(A) (-3K)	18-36	9	1667	780	20	80	2200uF
FCWS-2412(A) (-3K)	18-36	12	1250	760	20	82	1800uF
FCWS-2415(A) (-3K)	18-36	15	1000	760	20	82	1500uF
FCWD-2405(A) (-3K)	18-36	+/-5	+/-1500	780	20	80	+/-1200uF
FCWD-2412(A) (-3K)	18-36	+/-12	+/-625	760	20	82	+/-820uF
FCWD-2415(A) (-3K)	18-36	+/-15	+/-500	760	20	82	+/-680uF
FCWS-4803.3(A) (-3K)	36-72	3.3	3000	272	20	76	1000uF
FCWS-4805(A) (-3K)	36-72	5	3000	390	20	80	1000uF
FCWS-4809(A) (-3K)	36-72	9	1667	390	20	80	820uF
FCWS-4812(A) (-3K)	36-72	12	1250	380	20	82	680uF
FCWS-4815(A) (-3K)	36-72	15	1000	380	20	82	560uF
FCWS-4824(A) (-3K)	36-72	24	625	380	20	82	470uF
FCWD-4805(A) (-3K)	36-72	+/-5	+/-1500	380	20	82	+/-330uF
FCWD-4812(A) (-3K)	36-72	+/-12	+/-625	380	20	82	+/-220uF
FCWD-4815(A) (-3K)	36-72	+/-15	+/-500	380	20	82	+/-100uF

Note: Other input to output voltages may be available. Please contact factory.

⁷ NOMINAL INPUT VOLTAGE.

⁸ NOMINAL INPUT VOLTAGE, FULL LOAD.

● SELECTION GUIDE(2) 4:1 10W-15W OUTPUT

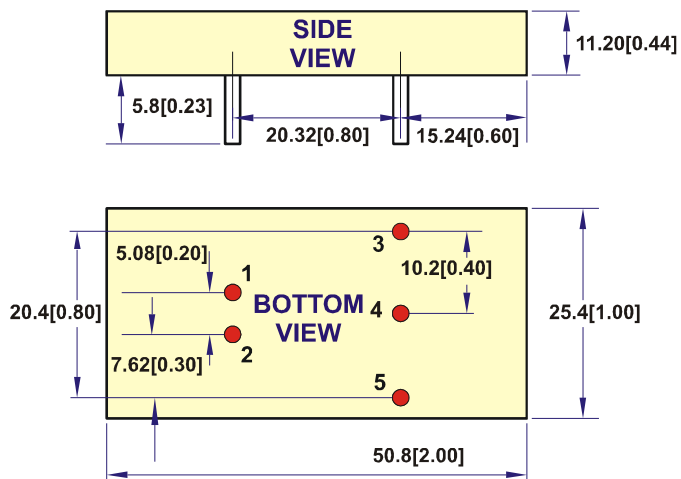
MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT ⁹ CURRENT(mA)		EFF (%) ¹⁰	CAPACITOR LOAD MAX.
				FULL LOAD	NO LOAD		
FCWS-1203.3T(A)	9-36	3.3	3000	1070	35	78	1800uF
FCWS-1205T(A)	9-36	5	3000	1580	30	79	1800uF
FCWS-1209T(A)	9-36	9	1670	1580	30	79	1500uF
FCWS-1212T(A)	9-36	12	1250	1525	30	82	1200uF
FCWS-1215T(A)	9-36	15	1000	1525	30	82	1000uF
FCWD-1205T(A)	9-36	+/-5	+/-1500	1570	30	80	+/-660uF
FCWD-1209T(A)	9-36	+/-9	+/-834	1530	30	82	+/-660uF
FCWD-1212T(A)	9-36	+/-12	+/-625	1530	30	82	+/-660uF
FCWD-1215T(A)	9-36	+/-15	+/-500	1530	30	82	+/-660uF
FCWS-2403.3T(A)	18-72	3.3	3000	543	20	76	1000uF
FCWS-2405T(A)	18-72	5	3000	790	20	79	1000uF
FCWS-2412T(A)	18-72	12	1250	760	20	82	820uF
FCWS-2415T(A)	18-72	15	1000	760	20	82	680uF
FCWD-2405T(A)	18-72	+/-5	+/-1500	780	20	80	+/-470uF
FCWD-2409T(A)	18-72	+/-9	+/-834	760	20	82	+/-470uF
FCWD-2412T(A)	18-72	+/-12	+/-625	760	20	82	+/-150uF
FCWD-2415T(A)	18-72	+/-15	+/-500	760	20	82	+/-100uF

Note: Other input to output voltages may be available. Please contact factory.

⁹ NOMINAL INPUT VOLTAGE.

¹⁰ NOMINAL INPUT VOLTAGE, FULL LOAD.

● MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT DETAILS



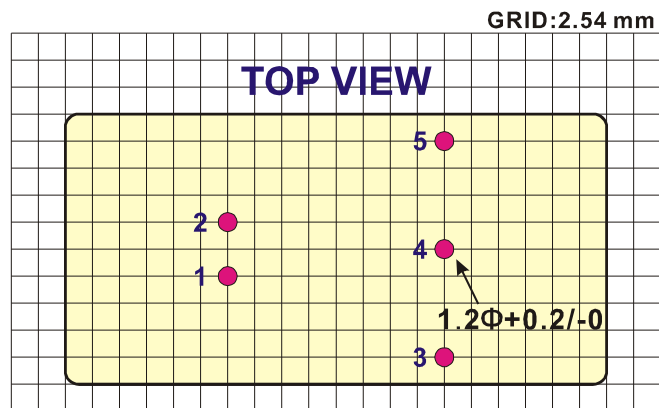
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	NP	Common
5	-Vout	-Vout

NOTE: Pin Size is Tolerance 1.00Φ ±0.10mm

All dimensions are in millimeters [inches]

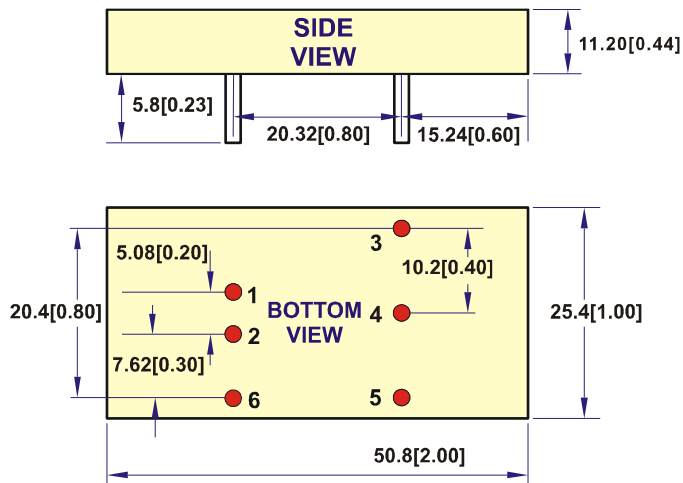
Tolerance .X or .XX= ±0.80mm

All dimensions are in millimeters[inches]



● MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT DETAILS

REMOTE CONTROL(Specially Models) **PACKAGE "A"**



PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	NP	Common
5	-Vout	-Vout
6	Remote ON/OFF	

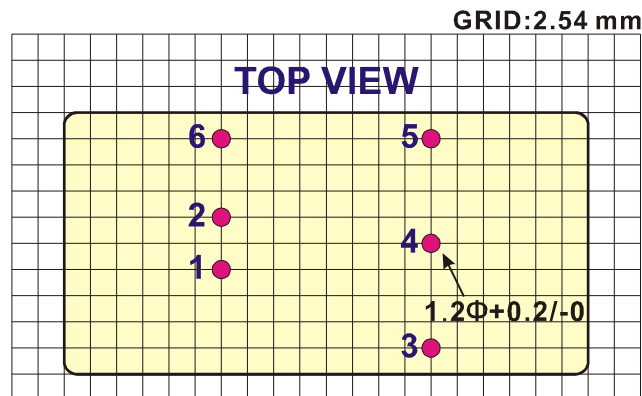
NOTE:

Pin Size is Tolerance $1.0\Phi \pm 0.10\text{mm}$

All Dimensions In mm(Inches)

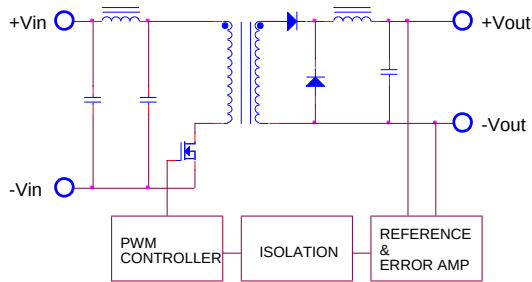
Tolerance .X or .XX= $\pm 0.80\text{mm}$

All dimensions are in millimeters[inches]

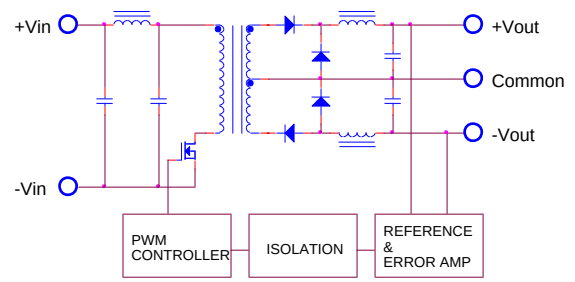


● SIMPLIFIED SCHEMATIC

SINGLE OUTPUT

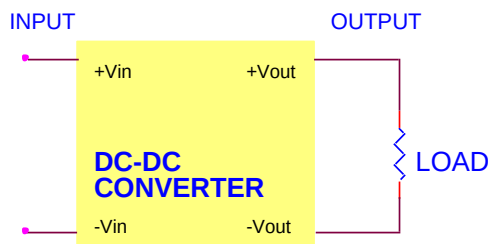


DUAL OUTPUT

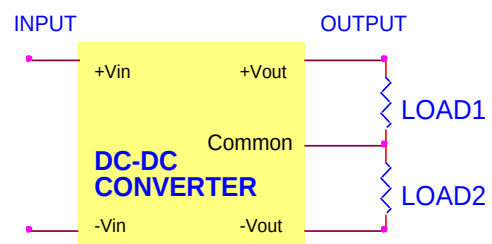


● TYPICAL APPLICATIONS

SINGLE OUTPUT



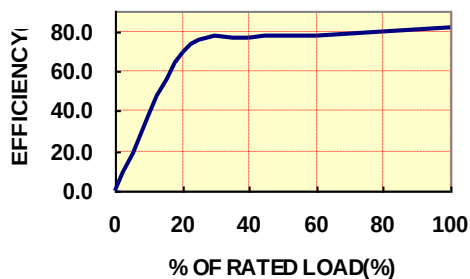
DUAL OUTPUT



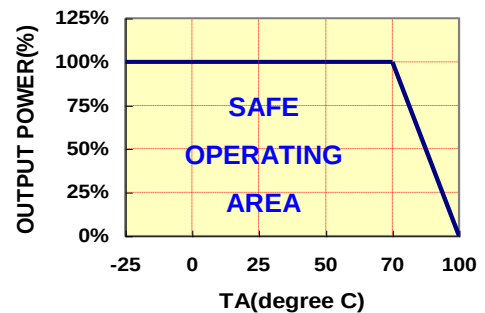
● TYPICAL PERFORMANCE CURVES

Specifications typical at $T_a=25^\circ\text{C}$, nominal input voltage, rated output current unless otherwise specified.

OUTPUT LOAD VS EFFICIENCY



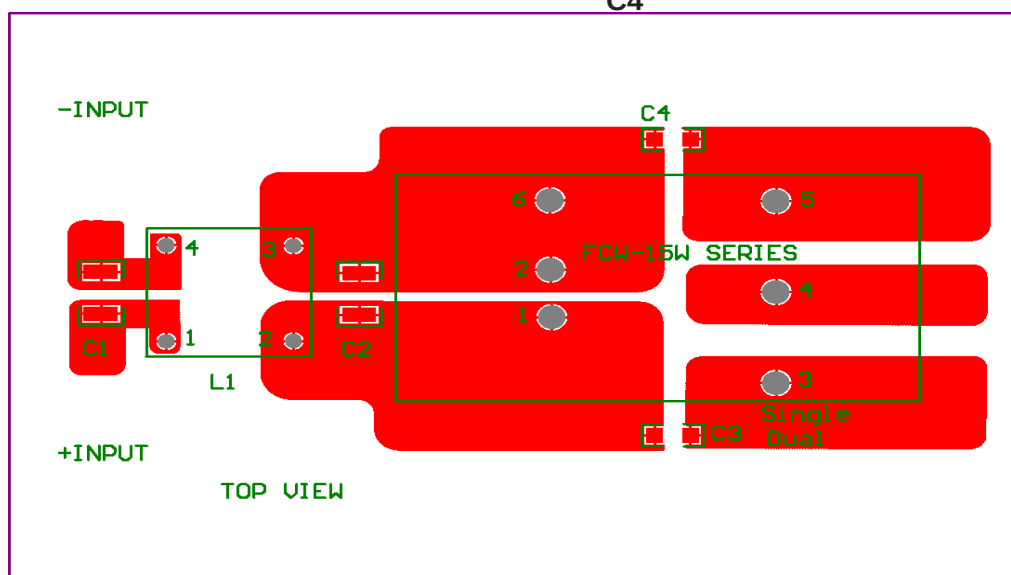
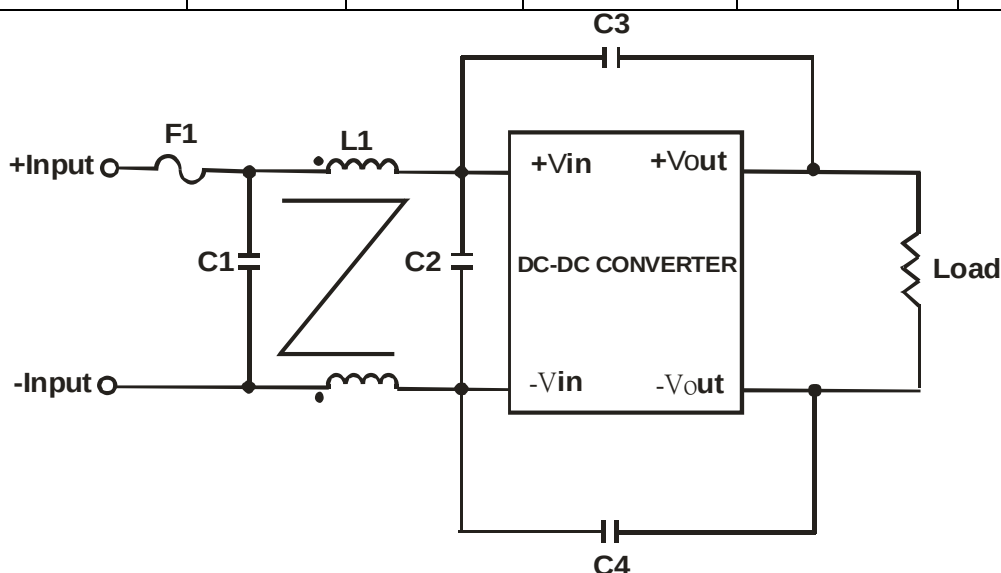
TEMPERATURE DERATING



● Recommended Filter for EN55032 Class B Compliance

The components used in the above figure, together with the manufacturer's part numbers for these components, are as follows:

	C1	C2	C3	C4	L1
FCW*-12**(A)(-3K)	3.3uF/50V 1812 MLCC	N/A	1000pF/2KV or 1000pF/3KV MLCC	1000pF/2KV or 1000pF/3KV MLCC	325uH Common Choke
FCW*-24**(A)(-3K) FCW*-12**T(A)	3.3uF/50V 1812 MLCC	N/A	1000pF/2KV or 1000pF/3KV MLCC	1000pF/2KV or 1000pF/3KV MLCC	325uH Common Choke
FCW*-48**(A)(-3K) FCW*-24**T(A)	1.5uF/100V 1812 MLCC	1.5uF/100V 1812 MLCC	1000pF/2KV or 1000pF/3KV MLCC	1000pF/2KV or 1000pF/3KV MLCC	325uH Common Choke



Recommended EN55032 Class B Filter Circuit Layout

● INPUT FUSE SELECTION GUIDE

9-18V & 9-36V INPUT VOLTAGE(VDC)	18-36V & 18-72V INPUT VOLTAGE(VDC)	36-72V INPUT VOLTAGE(VDC)
3000mA Slow-Blow Type	1400mA Slow-Blow Type	700mA Slow-Blow Type
		

Note: Certain applications may require the installation of external fuse in front of the input.

FCW SERIES APPLICATION NOTES:

EXTERNAL CAPACITANCE REQUIREMENTS:

No external capacitance is required for operation of the FCW series.

To meet the reflected ripple requirements of the converter, an input impedance of less than 0.5 ohm from DC to 220KHz is required.

External output capacitance is not required for operation, however it is recommended that 10uF tantalum and 0.1uF ceramic capacitance be selected for reduced system noise.

Additional output capacitance may be added for increased filtering, but should not exceed 1000uF.

We Can Offer EMC-Filter According To EN55032 Class B.

Negative Outputs:

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.

FOR MORE INFORMATION CALL:

Danube Enterprise Co., Ltd.

Tel: 886-7-3755165

Fax: 886-7-3755330

E-mail: danube@ms10.hinet.net

Home Page

<http://www.danube.com.tw>
